

Chemistry A2 2021/22

Week		KEN (5hrs /fortnight)	Knowledge	Skills	Assessment opportunities Thurs A4 – SHS & B5 – KEN	SHS (4hrs /fortnight)	Knowledge	Skills
1A	6.09.21	No lessons			No lessons	No lessons		
2B	13.09.21	3.2.2 – 3.2.3 rates and equilibrium (Kc)	Review Yr12 Rates - Orders of reactions	Maths Skills: graph interpretation. Practical skills: collecting data	1 – KEN	6.1.2 carbonyl compounds	oxidation of aldehydes reactions of carbonyl compounds with NaBH ₄ and HCN the mechanism of nucleophilic addition in these reactions.	Carbonyl compounds are compounds that contain the carbonyl functional group C=O - need to draw and name examples
3A	20.09.21		Le Chatelier Principal		2 – SHS - aromatic chemistry		using 2,4-dinitrophenylhydrazine to detect and identify carbonyls using Tollens' reagent to identify aldehydes.	complete the practical activity and identify some unknown compounds as containing or not containing carbonyl groups
4B	27.09.21	5.1.1 rates	Concentration and rate: collecting data/ half life graphs	Maths Skills: Graph interpretation/ manipulation and analysis. Practical Skills: collecting data	3 – KEN - rates (AS + A2)	6.1.3 carboxylic acids & esters PAG 6.2	the solubility of carboxylic acids reactions of carboxylic acids with metals and bases.	Link to AS - acids & bases and reactions of acids
5A	4.10.21		Temperature and rate: Maxwell-Boltzman Arrhenius equation (finding E _a)	Maths Skills: rearranging equations, using and rearranging equations using Logs. Drawing graphs.	4 – SHS – AS organic mechanisms	(PAGs 6.1 or 6.4 & 6.3)	esterification hydrolysis of esters formation of acyl chlorides use of acyl chlorides in synthesis.	carry out the esterification practical and make an ester in the lab

				Calculations involving graphs.				
6B	11.10.21	PAG 9.1 – 9.3	Finding E_a from practical investigation	PAG 9: Safe handling of equipment and chemicals, Following a given method, analysis of data	5 – equilibrium	6.3.1 chromatography	one-way TLC chromatograms in terms of R_f values gas chromatograms in terms of retention times and the proportions of the components of a mixture qualitative analysis of organic functional groups on a test-tube scale.	Maths skills - Calculation: Chromatography Practical - TLC (different amino acids)
7A	18.10.21	PAG 10.1 – 10.3	Finding rate constant from practical investigation	PAG 9: Safe handling of equipment and chemicals, Following a given method, analysis of data	6 – SHS - AS analysis – mass spec & IR			
Half term								
8B	1.11.21	5.1.2 equilibrium	Review LeChatelier		7 – acids (AS + A2)	6.3.2 NMR & combined techniques	NMR spectroscopy use of tetramethylsilane (TMS) the need for deuterated solvents, for example, $CDCl_3$.	Link to AS - mass spectrometry & IR spectroscopy
9A	8.11.21		K_c / K_p		8 – SHS - AS enthalpy (MCAT)		carbon-13 NMR spectroscopy the number of carbon environments the different types of carbon environment prediction about possible structures for an unknown molecule.	

10B	15.11.21	5.1.3 acids, bases & buffers PAG 11.1 – 11.3	Strong/ weak acids	Maths Skills: Calculating pH	9 – structure & bonding			
11A	22.11.21		Neutralisation	Maths Skills: calculating pH from reaction data (Concentrations/ volumes)	10 – SHS - AS enthalpy (Hess cycles)	5.2.1 lattice enthalpy	lattice enthalpy Born–Haber cycles calculation of lattice enthalpy.	Maths skills - Calculation: Lattice enthalpies
12B	29.11.21		Buffers- How are they made?	Research Skills: uses of buffers/ blood as a buffer solution	11 - REDOX		enthalpy changes in solution enthalpy cycles related to hydration	Maths skills - Calculation: enthalpies of solution
13A	6.12.21		Buffer calculations	Math Skills: Finding the pH of combinations of weak acids/ weak bases	12 – SHS - AS redox & oxidation nos	5.2.2 entropy	entropy changes calculation of entropy changes	Maths skills - Calculation of entropy changes
14B	13.12.21		Buffers - what happens when you add different volumes/ concentrations of acid/alkali	Math Skills: calculations involving concentrations/ volumes/excess/ pH	13 - Titration Calculations		free energy the Gibbs' equation using free energy to predict feasibility	Maths skills - Calculations using the Gibbs' equation
Xmas hols								
15A	3.01.22	Nitrogen Chemistry	Amines/ Amides- Structures and naming	logical sequencing/ drawing molecules	Review mocks	5.3.1 transition metals PAG 12.1 – 12.3	d-block elements and transition elements electron configurations of atoms and ions variable oxidation state, the formation of coloured compounds, and catalytic behaviour.	Link to AS writing electron configurations Link to AS redox - writing oxidation numbers Link to GCSE triple content on transition metals (coloured compounds & catalysts)

16B	10.01.22		Amino acids - Structure, reactivity with acids/ alkalis	Practical Skills: Collecting data, interpreting data			the formation of dative covalent bonds between metal ions and ligands in the formation of complex ions examples of complex ions with four and six coordination and their associated shapes.	Link to AS - shapes of molecules & dative coordinate bonding writing complex formulae drawing shapes of complex ions
17A	17.01.22		Polymers - peptide links	Interpreting diagrams	14 – SHS – calculations (titrations)		<i>cis-trans</i> isomerism optical isomerism the role of <i>cis</i> -platin in the treatment of cancer	Link to AS - isomerism
18B	24.01.22		Polyesters/ Nylon	Practical Skills: safe handling of Hazardous chemicals, interpretation of equations (predicting products)	15 – synthesis (AS + A2)		ligand substitution reactions of $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ and $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ biological importance of iron in haemoglobin precipitation reactions with aqueous sodium hydroxide and aqueous ammonia.	be able to look at examples of reactions and predict the changes, if any Maths skills: Ligand substitution reactions Maths skills: Electron configurations of transition metal elements and their ions Practical: Complex formation

19A	31.01.22	Synthesis	Extending the carbon Chain	Interpreting diagrams	16 – SHS – redox half equations		<p>the redox reactions and the accompanying colour changes for the $\text{Fe}^{2+} / \text{Fe}^{3+}$ and $\text{Cr}^{3+} / \text{Cr}_2\text{O}_7^{2-}$ systems</p> <p>the redox and disproportionation reactions of copper</p> <p>qualitative analysis of ions on a test-tube scale.</p>	Practical: Variable oxidation states of transition metal elements
20B	7.02.22	Revision			Revision		<p>the techniques and procedures used when carrying out redox titrations involving $\text{Fe}^{2+} / \text{MnO}_4^-$</p> <p>structured and non-structured calculations for $\text{Fe}^{2+} / \text{MnO}_4^-$ titrations</p> <p>the techniques and procedures used when carrying out redox titrations involving $\text{I}_2 / \text{S}_2\text{O}_3^{2-}$</p>	PAGS #12.1 & 12.2 - redox titrations
Half term								
21A	21.02.22	Mocks				Mocks		
22B	28.02.22	Synthesis	Synthesis pathways	research skills-finding reagents for reactions	16 – synthesis (AS + A2)	5.2.3 redox & electrode	standard electrode potential	Maths skills: Calculating cell e.m.f.

						potentials PAG 8.1 – 8.3	measuring cell potentials calculating cell potentials from electrode potentials.	
23A	7.03.22		2 step synthesis	Logical thinking, sequencing, predicting the products of reactions	17 – SHS - AS organic reactions		Prediction of the feasibility of a reaction using standard cell potentials Limitation of feasibility predictions	
24B	14.03.22		Reaction mechanisms	Interpreting diagrams, logical thinking	18- dependent on MOCK		Modern storage cells Fuel cells	Practical: Rechargeable cells
25A	21.03.22	Revision			19 – SHS – AS qualitative analysis	5.3.2 qualitative analysis PAG 7.1 – 7.3		
26B	28.03.22				20- Dependent on MOCK			
Easter Hols								
27A	18.04.22	Revision				Revision		
28B	25.04.22							
29A	2.05.22							
30B	9.05.22							
31A	16.05.22							
32B	23.05.22							
Half term								